Bus Stop and Bus Shelter Master Plan For City of Falls Church, Virginia

Adopted October 28, 2013

1. Introduction and Purpose

Buses fill an important role in the City's transportation network. Every day, buses running through the City of Falls Church pickup 1,400 passengers (source: WMTA ridership data). All of those pickups are made at bus stops. Well-designed bus stops provide a safe, comfortable place to wait for the bus. They also provide information about bus service and nearby amenities, such as shops, restaurants, and cultural attractions.

This plan establishes design standards for bus stops in the City of Falls Church, including the size, positioning, and style of shelters, benches, trash and recycling cans, informational signs, and bicycle racks. These standards should be used in the design of all bus stops in the City, whether publicly or privately funded.

This plan also identifies preferred locations for bus stops throughout the City. The preferred locations were selected taking into account riderhsip, nearby uses, and industry best practices regarding the placement of stops. Existing stops should be consolidated or shifted as necessary to match the preferred locations.

Lastly, this plan provides guidelines for implementation. The guidance includes direction to remain flexible to changing conditions and responsive to opportunities. The guidance also includes a timeline for improving bus stops in the City consistent with the guidelines of this plan.

2. Stop Design Standards

The City's Comprehensive Plan is the, "official policy guide for shaping the future of Falls Church" (Comprehensive Plan, p xi). Regarding the design of bus stops, the Comprehensive Plan provides the following guidance, "Provide attractive and unique bus shelters in front of activity generators in the commercial corridors" (p159) and, "Create a unique physical identity both within the Falls Church mailing area and the region. The environment should be such that people can tell when they are entering and exiting the City. This can be done through building form, streetscape, and entrance features in primary gateways to the City" (p14). Based on this guidance, two bus stop standards were developed, one for a stop with a bus shelter and one for a stop with a bench.

2.1 General Design Standards

The layout of bus stop amenities must be safe and accessible for all bus and sidewalk users. This generally means providing adequate space to maneuver around bus stop features and setting fixtures back from the road. The following standards hold for all bus stops, regardless of whether the stop includes a shelter or a bench:

1. Bus stops should have 30 feet of clear space to allow unblocked access to both the front and rear doors of a bus servicing the stop.
2. Bus stop signs should be placed 2 feet behind the face of the curb.
3. All other bus stop features should be placed at least 4 feet behind the curb.

4. Consistent with the City's recycling and trash can policy, all stops should include recycling and trash cans.
5. Bus stops should include pedestrian wayfinding information to inform riders and pedestrians of nearby attractions, shops, and restaurants.
6. When space and funding allow, bike racks should be installed adjacent to the bus stops. Bike racks should be inverted 'U' style racks, installed perpendicular to the curb and 3 feet from the side of any bus stop element.

2.2 Bus Stop with Shelter

Bus shelters are an important amenity for bus riders. Shelters provide protection from rain, snow, wind, and sun. This protection is especially important in the City where buses typically run once every 30 minutes at most times of the day. Therefore, a stop with a shelter is the preferred alternative and this option should be used to the extent possible, especially when ridership at a stop exceeds 15 boardings per day. Additionally, for reasons of community character and aesthetics, shelters should be installed in pairs, with a shelter on both sides of the street.

The following diagrams show the preferred design and layout of bus stop elements when a shelter is provided. Note that the bike racks are optional elements, to be included if space permits. Also note that these diagrams show a shelter with "full" walls. In some instances, due to space constraints, it may be necessary to use a cantilevered roof with the roof extending beyond the front edge of the side walls. If this is done, the look of the shelter will remain the same in terms of style, size, color, and shape.

Figure 1: Bus Stop with Shelter and Optional Bicycle Racks, Street View

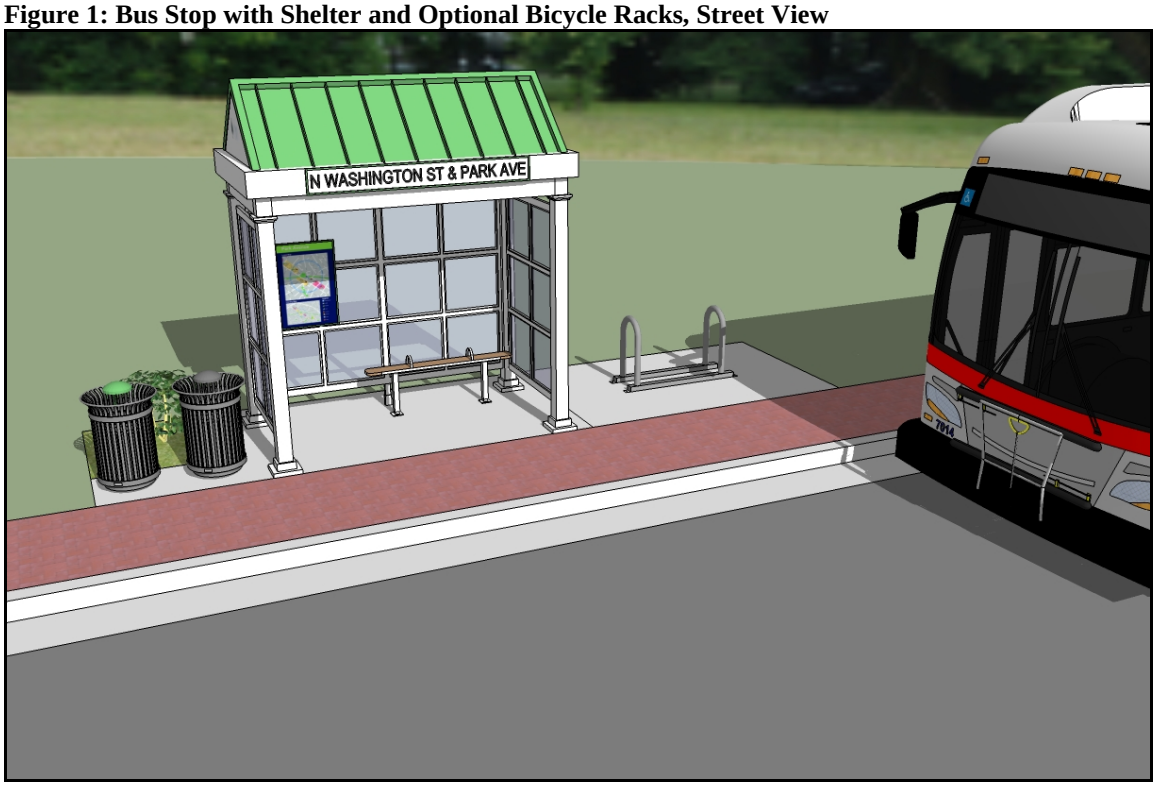
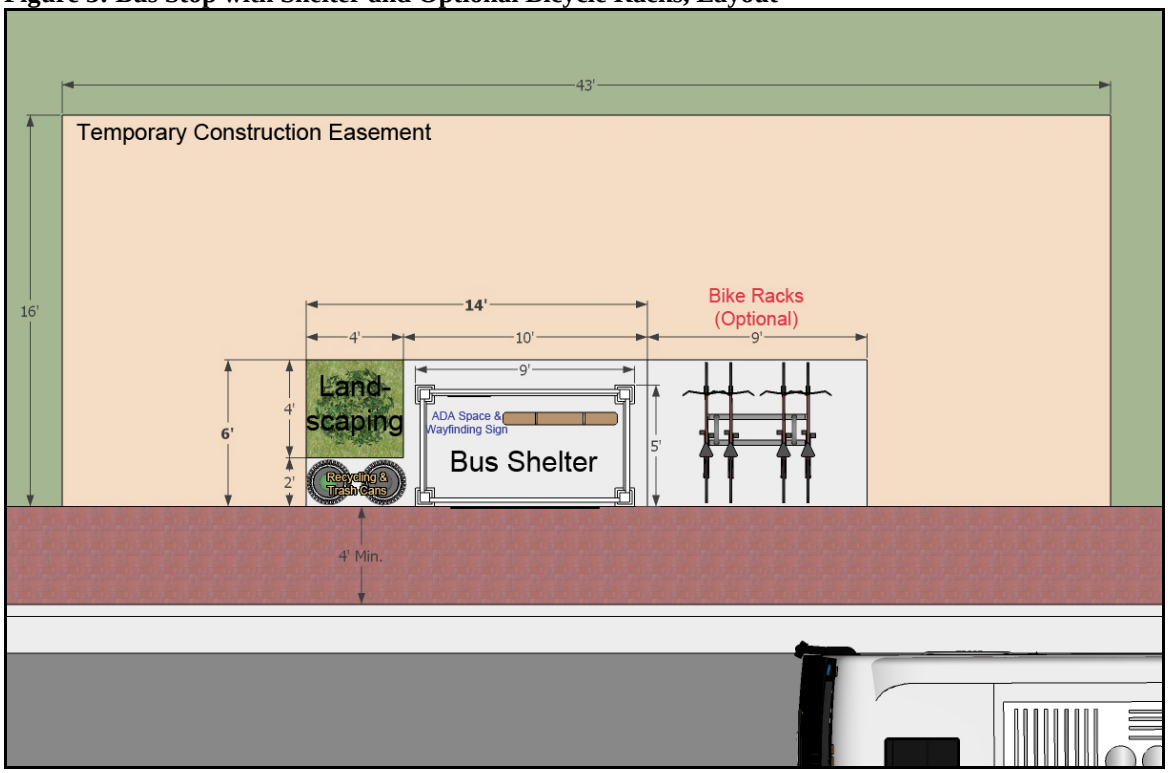


Figure 2: Bus Stop with Shelter, Street View

Figure 3: Bus Stop with Shelter and Optional Bicycle Racks, Layout



2.3 Bus Stop with Bench

While a bus shelter is the preferred alternative, a bench is the appropriate alternative when a shelter cannot safely fit at a stop location or when an easement allowing a shelter cannot be secured.

The following diagrams show the preferred design and layout of bus stop elements when a bench is provided. Note that the bike racks are optional elements, to be included if space permits.

Figure 4: Bus Stop with Bench and Optional Bicycle Racks, Street View

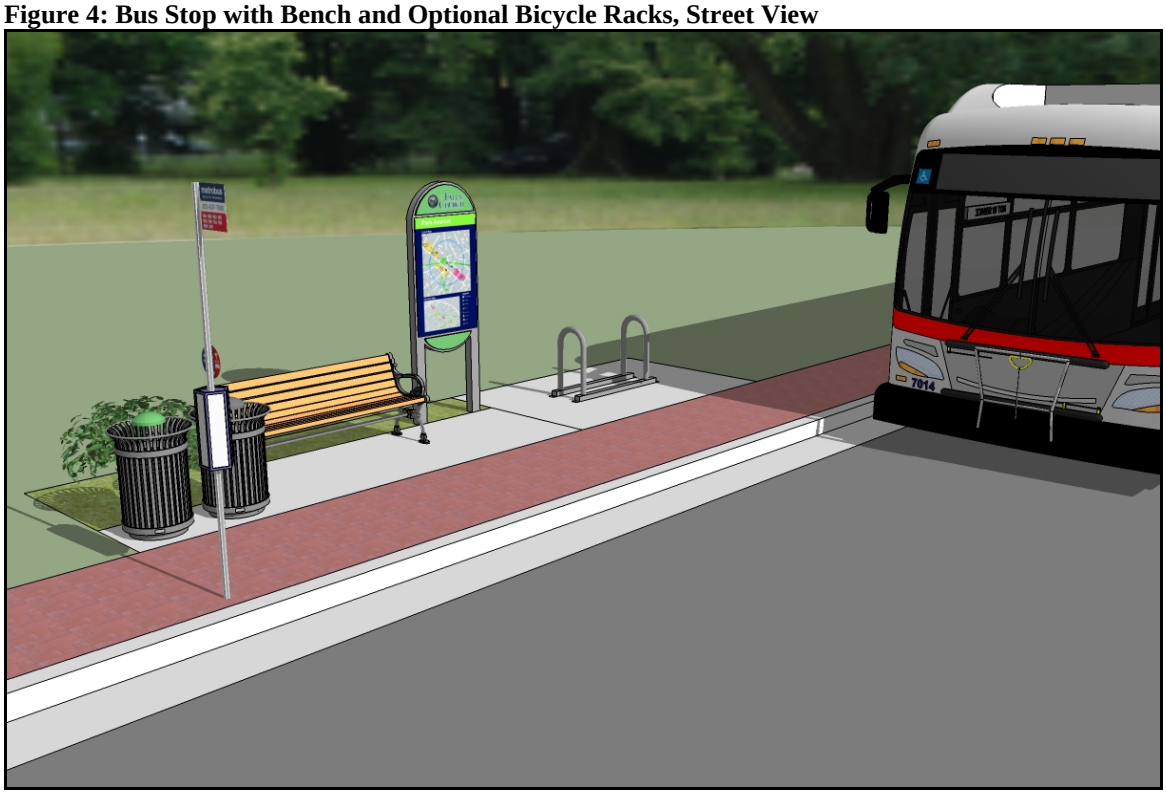


Figure 5: Bus Stop with Bench, Street View

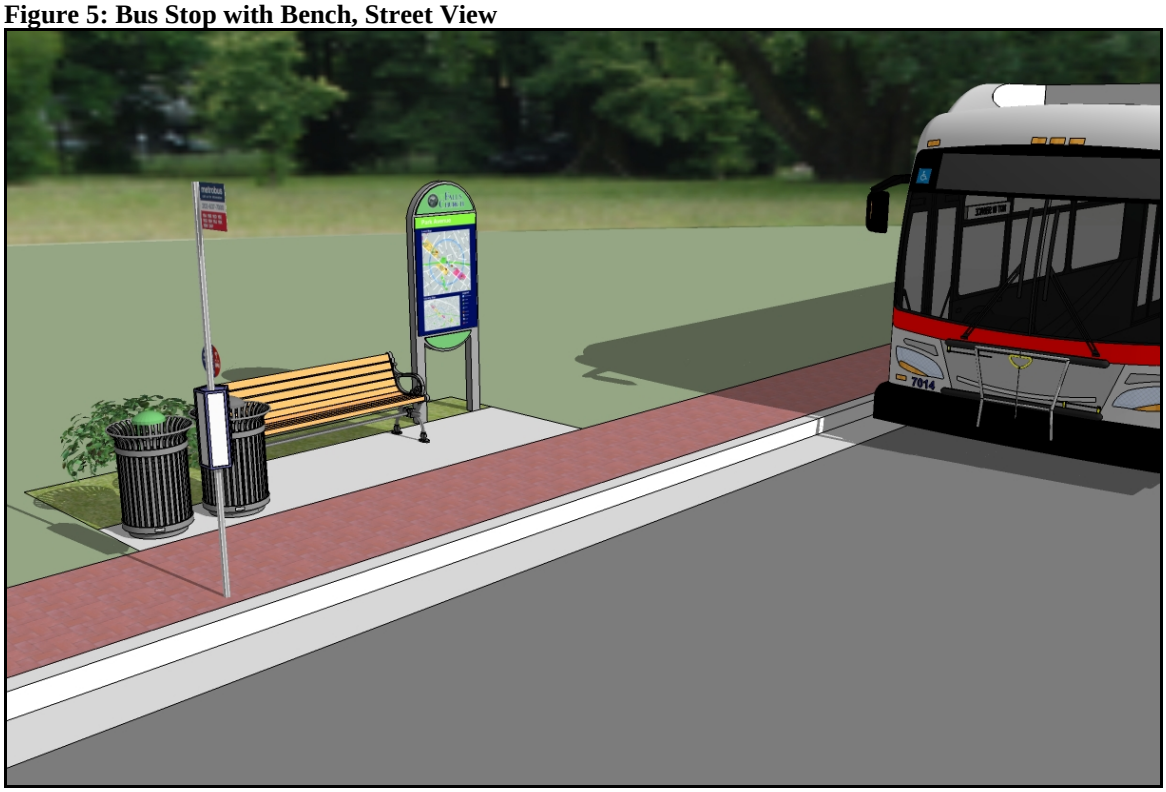
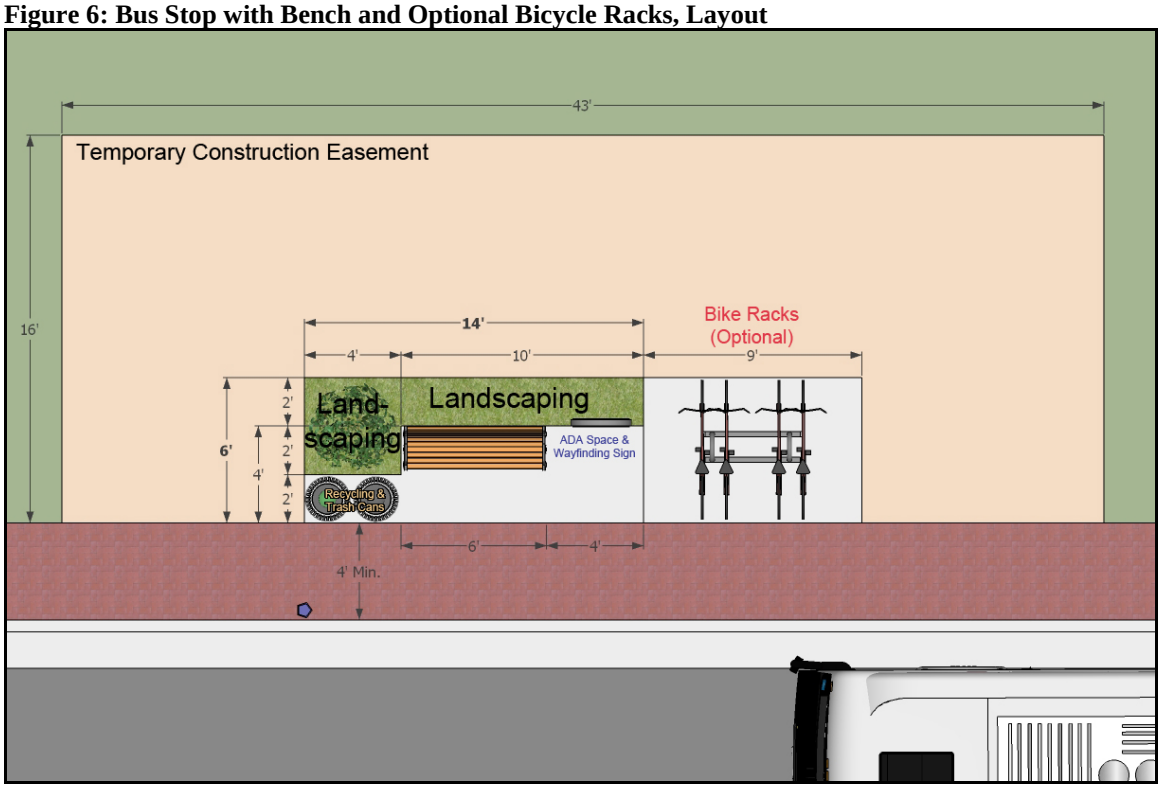


Figure 6: Bus Stop with Bench and Optional Bicycle Racks, Layout



2.4 Bicycle Racks

The City's Comprehensive Plan establishes a goal of encouraging the use of non-automotive modes of transportation within the City and to the region. An important part of encouraging bicycling is providing sufficient bike parking. Therefore, bicycle racks should be installed close to bus stops whenever space and funding allow. The diagrams in this plan show the bike racks installed adjacent to the bus stop. During implementation, it may be necessary to move the bike racks to another nearby location to avoid obstacles such as trees or to maintain sufficient pedestrian passage. The implementation matrix in this plan estimates the cost to secure easements. When negotiating for easements, an easement large enough to include bike racks should be acquired whenever the cost of such an easement will not exceed the estimated costs defined in this plan.

3. Preferred Bus Stop Locations

The location of bus stops relative to nearby intersections and the frequency of bus stops along a particular route significantly impact rider safety and quality of service. Additionally, nearby developments and uses influence preferred stop locations. To balance safety, speed of travel, and rider convenience, the following methodology was developed. This methodology was used to develop the preferred stop locations shown in Figure 7. If during implementation, it is not feasible to place stops at the preferred locations, then the methodology should be followed to the extent possible.

3.1 Location of Bus Stops Relative to Intersections

Stop location relative to nearby intersections impacts rider safety. Bus riders often have to cross the street to reach their stop, either to board the bus or when alighting from the bus. Stops near intersections, especially intersections with traffic lights, encourage riders to cross the street safely. Stops placed away from intersections, or "mid-block", encourage riders to cross in the middle of the block. For these reasons, stops should be placed close to signal-controlled crossings.

Anther issue is whether to place stops on the "near side" of the intersection, meaning before the light, or on the "far side" of the intersection, meaning after the light. Stops on the far side are preferred because they are generally safer and more efficient. The stops are safer because right-turning vehicles are not encouraged to turn around the stopped bus, possibly striking pedestrians crossing the street. The stops are more efficient because it lessens the chance of a bus servicing a stop and then having to wait at a red light.

In order of importance, the following methodology should guide the selection of bus stop locations relative to intersections.

1. Bus stops should be placed near light-controlled crossings.
2. Bus stops should be placed such that buses servicing the stop will not block crosswalks, intersections, or driveways
    a. "Near side" stops should be within 5 to 15 feet of the end of the curb radius. This close distance provides safe access to the stop for pedestrians.
    b. "Far side" stops should be within 50 to 60 feet of the intersection. This allows the bus to completely clear the intersection, but keeps the stop

close enough to the intersection to provide safe access to the stop for pedestrians.

3. Bus stops should be placed on the "far side" of the intersection.

3.2 Spacing of Bus Stops

Stop spacing impacts bus system performance, which in turn affects the bus riding experience and bus ridership. Stops that are spaced too close together cause the bus to stop more often than necessary, slowing down travel times for bus riders. Stops that are spaced too far apart put a burden on riders who must walk overly far to reach their stop.

Based on research performed by industry experts (see Vuchic, Vukan R. *Urban transit*. Wiley, 2005) and best practices from transit operations (see Washington Metropolitan Area Transit Authority. *Guidelines: Design and Placement of Transit Stops*. 2009) the preferred spacing for bus stops is 4 to 5 stops per mile, meaning one stop every 1,000 to 1,200 feet. Therefore, the following principles should guide spacing of stop locations.

1. Stops should not be further than 1,200 feet apart.
2. There should not be more than 6 stops in any one mile stretch.

3.3 Importance of Nearby Supporting Uses

The previous two sections speak to the placement of stops relative to intersections and the spacing of stops relative to each other. The placement of stops close to supporting land uses is also important. These are land uses likely to generate more demand for bus service. Placing stops near these uses increases accessibility by limiting the distance riders must walk. Supporting land uses include popular entertainment venues, dense centers of housing, and concentrated office and retail uses.

Existing land uses supportive of bus service can be identified using historical ridership data. Comparing bus stop usage at stops across the City reveals the areas with the highest demand for bus service. Stops should be placed in high ridership areas to maximize bus system usage. This guidance comes directly from the Comprehensive Plan, which states, "Add attractive bus shelters at highest volume metrobus and George stops, such as at the intersection of Broad and Washington Streets." (p158).

In addition to ridership, anticipated development activity should influence stop location as well. While historical data shows where demand existed in the past, plans for future development indicate where demand will exist in the future.

3.4 Combined Methodology and Preferred Bus Stop Locations

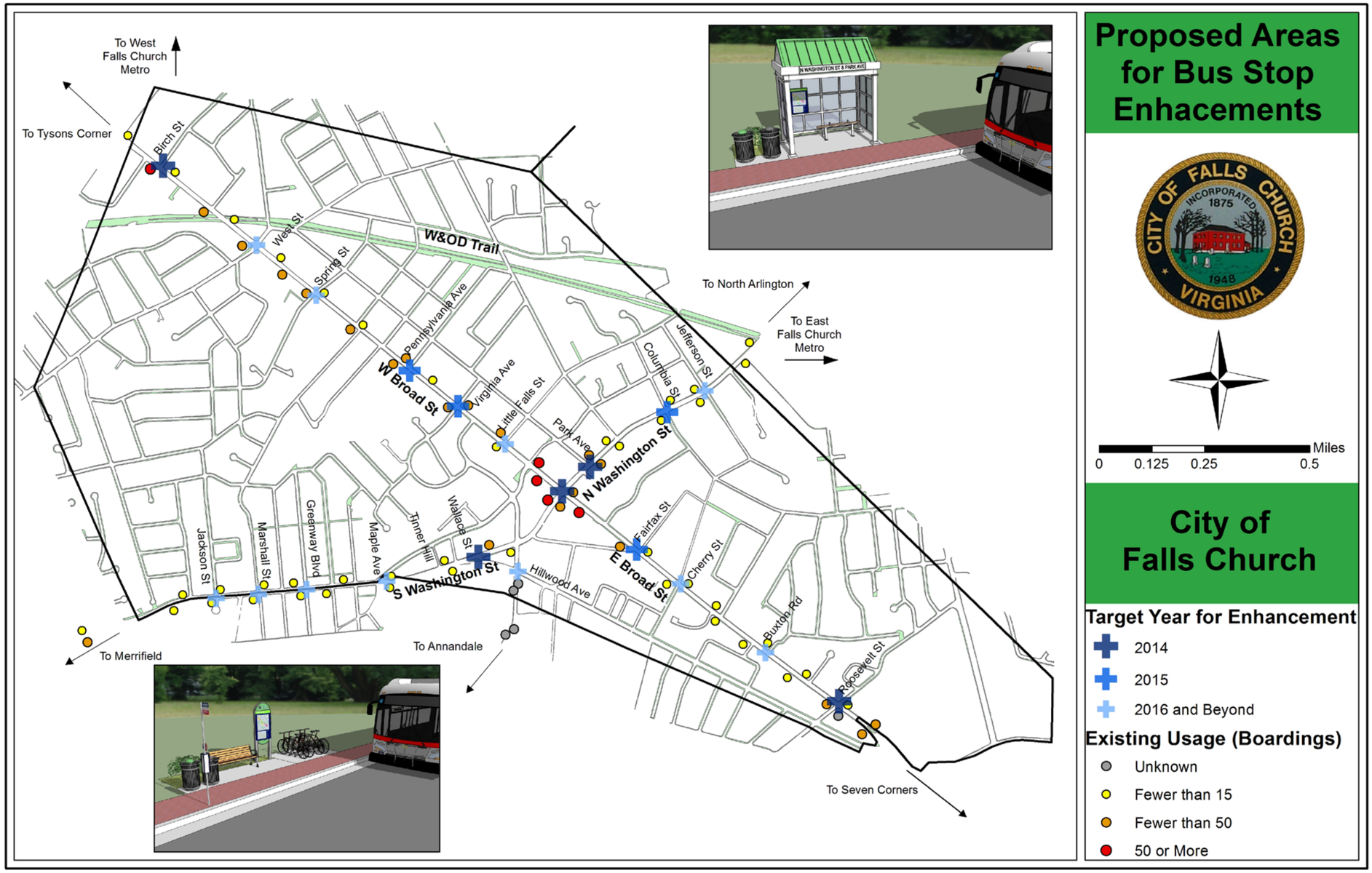
The guidance for stop location relative to intersections, stop spacing, and nearby supporting uses must be combined into a single methodology. The following prioritization should be used to provide a safe, accessible, and efficient bus system.

1. Bus stops should be placed near light-controlled intersections.
2. Bus stops should not be placed more frequently than 6 stops per mile.
3. Bus stops should be placed close to existing supporting uses, as evidenced by ridership data, or expected future supporting uses.
4. Bus stops should not be placed further than 1,200 feet apart.

After this methodology is applied to determine the preferred intersections for bus stops, the methodology for selecting bus stop locations relative to intersections should be applied.

Figure 7 shows the preferred intersections for bus stops. These locations were derived using the methodology defined in this plan.

Figure 7: Preferred Bus Stop Locations and Enhancement Priorities



4. Implementation

Implementation of this plan must be integrated with other staff responsibilities. This section provides an implementation matrix that specifies responsibilities, deadlines, and estimated costs in both money and time. This matrix should be used as a scheduling tool to ensure plan implementation.

4.1 Respond to Changing Conditions

During plan implementation, staff should respond to changing conditions. For example, preferred stop locations were selected based on conditions at the time of plan adoption. A significant change in development patterns or relocation of traffic signals may necessitate a reevaluation of preferred stop locations. As such, the methodology for stop selection should be checked periodically and the map of preferred locations updated as needed.

4.2 Respond to Opportunities

Redevelopment of existing properties presents opportunities to implement portions of this plan. For example, a developer may provide easements, stop amenities, or funding for stop amenities. Opportunities for such offers should be explored during redevelopment and put to use to the extent possible.

4.3 Bus Stop Consolidation

According to the stop spacing guidelines, the City should reduce the total number of bus stops in the City. This can be achieved through consolidation of existing stops. Stop consolidation should occur following installation of enhanced amenities and be subject to a public process. A public process is necessary to ensure equity issues are identified and addressed. The following process should be used in making the determination to consolidate stops.

1. Enhance preferred stop.
2. Wait one month to allow bus riders to take notice of the enhanced stop.
3. Identify nearby stops for potential consolidation based on stop spacing guidelines.
4. Schedule a public meeting during a regular meeting of the Citizens Advisory Committee on Transportation (CACT) and post notices at the identified stops. Written comments should be sent to the staff support for the CACT.
5. The CACT hosts a public meeting to discuss the consolidation of stops. Based on the discussion at the public meeting, the CACT makes a recommendation to the City Manager to either consolidate or not consolidate the identified stops.
6. The City Manager determines which stops, if any, to consolidate.

4.4 Funding

At the time of adoption of this plan, the City has available the following funds for the enhancements of bus stops.

$130,000 – funded CIP item using state and federal grant funds.

$200,000 – regional funds from the Northern Virginia Transportation Authority.

After the existing funds are exhausted, the City should seek additional funds until all bus stops within the City have been enhanced.

4.5 Maintenance Partnerships

Other jurisdictions partner with outside groups to offset the costs of stop and shelter maintenance. For example, Arlington County operates an adopt-a-stop program. Program participants agree to perform trash pickup and snow removal. In return, the County publicly recognizes stop adopters with signs posted at the adopted bus stops. Another option to offset costs is to rent advertising space at bus stops. The revenue can be used to pay for stop and shelter maintenance costs. A third option for reducing maintenance costs is to secure agreements from developers to maintain bus shelters constructed as part of a redevelopment project. As more stops are enhanced throughout the City, staff should explore opportunities to partner with private groups to offset the costs of maintenance.

4.6 Implementation Matrix

Barring outside opportunities or changing conditions, the City should proceed with enhancing the preferred stop locations identified in this plan. The preferred stop locations are split into three categories, "2014", "2015", and "2016 and beyond". See Figure 7. This pacing of implementation is intended to make it easier to budget the time necessary to complete the various tasks associated with enhancing the identified stops. The below matrix describes the steps needed to implement the plan as described for the "2014" and "2015" stops. Implementation of the plan for stops in the "2016 and beyond" category should follow a similar pattern.

The below matrix assumes the City is performing and paying for all work related to stop enhancements. Opportunities to leverage investments from private sources should be used to reduce these costs.

Note that when negotiating for easements, the easements in question should be considered as a block and funds applied as needed within that block. For example, instead of spending $10,000 to negotiate for 1 easement, $40,000 should be used to negotiate for 4 easements. This allows for flexibility during negotiations.

Note that the dollar costs and staff times in this chart are estimates and that they will vary for any given stop.

Matrix of Implementation Steps and Estimated Costs

Action	Responsibility	Calendar Year	Dollar Cost	Staff Time
Adopt Bus Stop Master Plan	City Council	2013	$0	32 hours
Budget Funding for Shelter Maintenance	City Council	Continuing Obligation	$1,000 per year per shelter	
Final Engineering for Shelters and Pads	On Call Consultant	2013	$5,000	20 hours
Surveying and	On Call	2014	$10,000 per	20 hours for up

Engineering Design for 2014 Stops	Consultant		location	to 4 shelters
Acquire Easements as Required for 2014 Stops	Consultant	2014	$10,000 per easement	20 hours for up to 4 shelters
Procure Contract for Stop Construction and Shelter Installation	Department of Public Works	2014	$0	50 hours
Install 2014 Stops	Selected contractor	2014	$15,000 per shelter	60 hours for up to 4 shelters
Surveying and Engineering Design for 2015 Stops	On Call Consultant	2015	$10,000 per location	20 hours for up to 4 shelters
Acquire Easements as Required for 2015 Stops	Consultant	2015	$10,000 per easement	20 hours for up to 4 shelters
Install Shelters for 2015 Stops	Selected contractor	2015	$15,000 per shelter	60 hours for up to 4 shelters

Appendix A: Resolution Approving this Policy

WHEREAS, the provision of bus shelters fulfills an important human service need to provide safe, comfortable conditions for bus passengers; and

WHEREAS, consistent with the goals and objectives of the City's Comprehensive Plan to provide attractive streetscape elements that distinguish the City from other jurisdictions, the shelters depicted in the Master Plan will be an attractive addition to the City's streetscape and will help distinguish the City from surrounding jurisdictions; and

WHEREAS, consistent with the goals and objectives of the City's Comprehensive Plan to encourage the use of non-automotive modes of transportation, the Master Plan will increase passenger safety, accessibility, and comfort, thereby attracting additional bus riders and decreasing congestion on City streets; and

WHEREAS, consistent with the City's Comprehensive Plan, the Master Plan prioritizes the installation of bus shelters at high volume bus stops and in commercial corridors.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Falls Church, Virginia that the Bus Stop and Bus Shelter Master Plan is hereby adopted as a guiding document for the development and improvement of bus stops in the City, and is incorporated by reference into the City of Falls Church Comprehensive Plan.

Appendix B: Public Engagement

This plan was developed by City staff based on the goals and policies in the City's Comprehensive Plan and in cooperation with the City Council, the Planning Commission, and the Citizens Advisory Committee on Transportation. This plan was presented and discussed at the following meetings:

- March 18, 2013 Planning Commission work session
- August 19, 2013 Planning Commission work session
- September 11, 2013 Citizens Advisory Committee on Transportation meeting
- October 9, 2013 Citizens Advisory Committee on Transportation meeting
- October 21, 2013 Planning Commission meeting
- October 21, 2013 City Council work session
- October 28, 2013 City Council meeting

This plan was endorsed by the following boards and commissions.

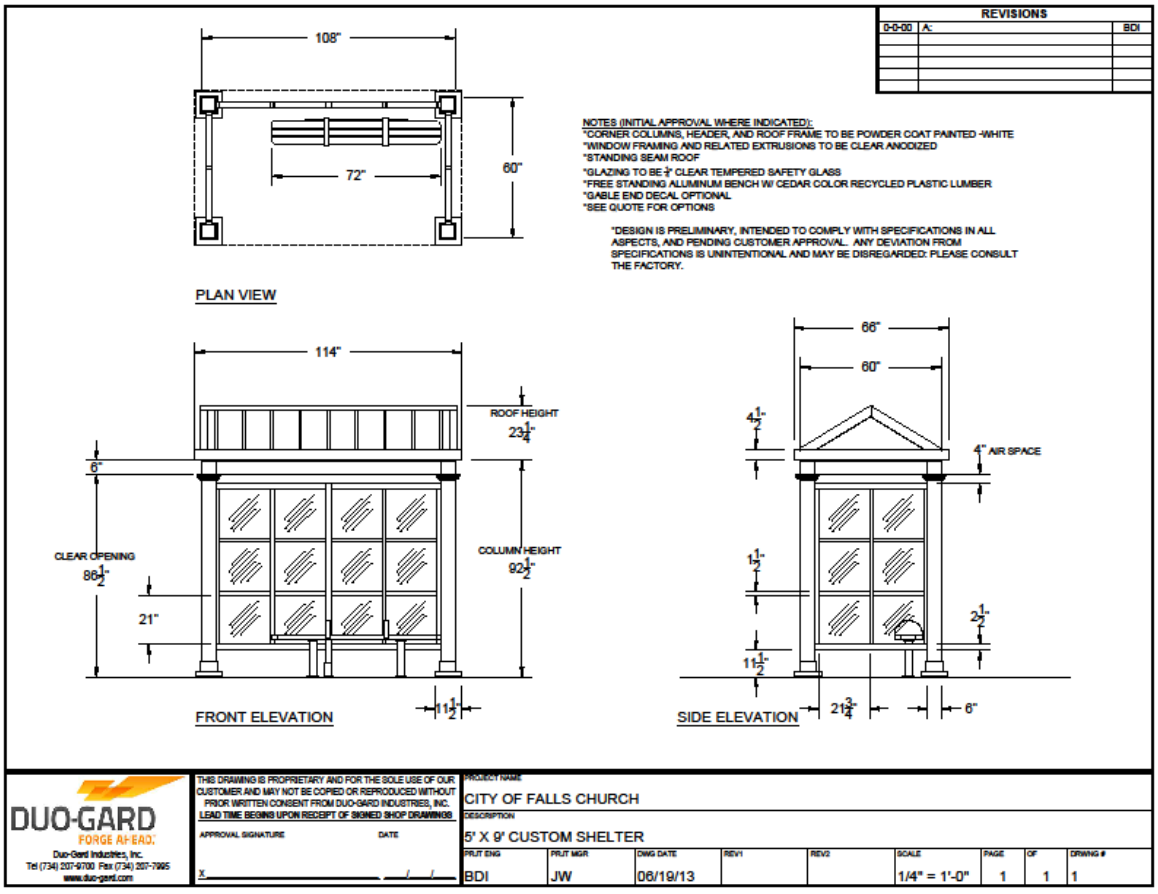
- Citizens Advisory Committee on Transportation
- Planning Commission

Appendix C: Shelter Specifications

The current specifications are draft specifications provided by Duo-Gard Industries. After adoption of this plan, the specifications will be modified to include the following additional features:

1. Two sign boards placed inside the shelter to provide space for (i) bus maps and (ii) pedestrian wayfinding maps or community bulletin space.
2. An optional third board to allow commercial advertising space.
3. The traditional City Seal on one gable end and The Little City logo on the other gable end.
4. A top board sufficiently large to print the stop name on the board itself, as depicted in the Plan diagrams.
5. Optional lightning for the interior of the shelter.
6. Capability to have real-time bus arrival displays installed at a later time.

Additionally, the specifications will be modified to remove references to specific manufacturers.



SHELTERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Bus Stop Shelter – 5’ x 9’ – Colonial Series

1.3 REFERENCES

A. Federal Specifications (Fed. Spec.):
   1. QQ-A-200/9C(1)…Extruded aluminum members 6063-T5
   2. HH-I-521B…Insulation board, Thermal, Semi-Rigid Polyurethane.
   3. TT-S-001657…Sealants, Type 1.

B. American Society for Testing Materials (ASTM):
   1. C-920-79…Elastomeric Joint Sealants Type S, Class 12, Grade NS
   2. C-518...Insulation Board, Semi-Rigid Polyurethane.
   3. E-84…Standards method of test for surface burning characteristics of building materials.

C. American National Standards Institute (ANSI): ANSI A58.1… Gravity and Lateral Loads Design.

D. Uniform Federal Accessibility Standards: FED-STD-795, 4/1/88….4.13 Door Accessibility.

E. The Aluminum Association (AA): Designation System for Aluminum Finishes (March 1973)

F. International Conference of Building Officials, Uniform Building Code.

G. Public Law 101-336: Americans with Disabilities Act of 1990 (ADA).

1.4 DESIGN REQUIREMENTS

A. Basic Wind Speed: 120 mph.
B. Exposure Category: B
C. Snow Load: 25 psf

1.5 SUBMITTALS

A. Specified Manufacturer: Product shall be as manufactured by Duo-Gard Industries, Inc., Canton, MI. Requests for approval of other brands shall be submitted to owner 14 days prior to bid date and shall be accompanied by complete product data, drawings, and references, as described below. Samples submitted upon request.

B. Product Data: Submit manufacturer's product data, including materials, components, finish and all accessories and equipment furnished.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections and details, dimensions, anchorage, fasteners and locations, flashing and seal details if applicable, finish, and options.

D. Erection Drawings: Submit manufacturer's instructions and drawings, and develop erection procedures to enable field installation and repair.

E. Manufacturer's Project References: Submit list of completed projects including project name and location and type of shelters manufactured.

F. Warranty: Submit manufacturer's standard warranty.

G. Manufacturer to provide certification that shelter meets indicated structural loading requirements.
Certification to be provided by a Virginia engineer.- drawings to be stamped.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
1. Continuously engaged in Shelter manufacturing with a minimum of 15 years successful experience.
2. Able to demonstrate successful performance on comparable projects.
3. Responsible for all components, including structural design.

B. Installer's Qualifications:
1. Authorized by manufacturer to install Shelters.
2. Trained by manufacturer' standard training methods and policies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation with detailed written instructions for installation.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions.

1.8 WARRANTY

A. Warranty Period: One Year – additional on roof panels

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Duo-Gard Industries Inc., 40442 Koppernick Road, Canton, Michigan 48187. Phone (734) 207-9700. Fax (734) 207-7995. Web Site www.duo-gard.com. E-Mail info@duo-gard.com.

2.2 GLAZING

A. Window panels shall be: 1/4" thick tempered safety glass. Panels shall be gasketed with wrap-around pvc extrusion, and secured to the framing structure with special extrusions to provide a safe weather-protective enclosure. Window color shall be: clear.

B. Wall and roof panels shall be sealed as required to provide a water-proof barrier in compliance with Fed. Spec. II-S-001657 using ASTM C-920-79 sealants.

C. Glazing shall be split vertically in three even sections – see below for aluminum framing member size(s).

2.3 STRUCTURAL FRAMING

A. The shelter framework (columns, sills and headers) shall be fabricated using 6063-T5 extruded aluminum members Fed. Spec. QQ-A-200/9C(1). 6061-T6 alloy/temper shall be used where required.

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B. Extrusion shapes shall be engineered to provide a framework of adequate structural integrity to satisfy the uniform building code (UBC), and to meet the requirements for snow, wind and seismic loading for the location(s) being considered.

C. Column framing members shall be 6" x 6" x .150" thick square extruded aluminum tubes. Header tube shall be 2 ½" x 6". Side walls shall be 2 ½"" x 2 1/2" x 1/8" thick extruded aluminum tubes with 1 ½" x 2 ½" x 1/8" split mullions. Glass shall be in three equal vertical openings.

D. The framework shall be assembled with only stainless steel and aluminum fasteners to prevent rusting or electrolytic interaction with framing members.

E. Shelter framing components, and the method of fastening them to the supporting foundations, shall be capable of withstanding lateral loads per ANSI A58.1, the UBC, or applicable local building codes, whichever is more stringent.

F. Method of mounting shelter to concrete pad shall allow for up to 4" of slope adjustment.

G. Glass openings shall be split three ways with horizontal aluminum tubes

H. 6" x 6" columns to have formed aluminum base plate covers fabricated from .125" aluminum sheet and powder coat painted to match shelter finish.

I. 6” x 6” columns to have extruded aluminum crown molding fabricated from 2” x 2 ½” aluminum tubing and powder coat painted to match shelter finish.

2.4 MATERIALS

A. Roof configuration shall be shall be: Standing Seam Gable, customer to select color from roof pan color guide, with integral fascia/gutter member, min. 1/8” thick with 4” fascia. All supporting loads listed herein. Kynar finished roof panels from the factory carry a 20 -25 year warranty.

B. Joint Sealant:
   1. Factory-Applied Sealant: Gunnable, nonhardening, elastomeric sealant. ASTM C 920, Type S, Class 12, Grade NS. Fed Spec TT-S-1657, Type 1.n.
   2. Field-Applied Sealant: Approved by shelter manufacturer. As specified in Section 07920.

C. Field Fasteners:
   1. Comply with shelter manufacturer’s instructions for fastener types, quantities, and usage.

D. Aluminum Bench – 5’ Free Standing – per attached rendering – bench shall have adjustable height. The base columns shall be a minimum of 4” x 4” x 1/8” aluminum and powder coat painted white to match shelter finish. Slat shall be recycled HDPE – color shall be Cedar.

2.5 COLOR AND FINISH

A. Extruded aluminum framework shall be Powder Coat Painted White in accordance with the Aluminum Association. RAL #._____.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive shelters. Notify Architect of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure location to receive shelter is clean, flat, level, plumb, square, accurately aligned, and correctly located.

3.3 INSTALLATION

A. The manufacturer shall provide installation instructions complete with diagrams. Installation shall be performed by the manufacturer or his representative (option). The manufacturer shall guarantee the installation for a period of one (1) year from the date of acceptance.

3.4 CLEANING

A. Clean shelters in accordance with manufacturer's instructions.

B. Clean inside and outside of shelters immediately after installation.

C. Do not use harsh cleaning materials or methods that would damage the metal finish or glazing.

3.5 PROTECTION

A. Protect installed shelters from damage during construction.